MAR 27 1929

SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

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"SPEAK, SPEAK THOU FEARFUL GUEST!"

Modern Archæologists Outdo Longfellow

(*See page* 175)

Vol. XV No. 415

Bell Tones Studied by Physicist

Physics

"The silver-toned bells rang out a sweet old tune." Perhaps you think that is a trite statement but it is worse than that; it's a lie, according to Prof. Arthur Taber Jones of the Department of Physics at Smith College. If those bells have any silver in their tin and copper alloy the chance of their being sweet is very small and those notes you think you hear are not the ones the bells are playing.

This curious fact that the note you hear is not any one of the tones actually given out by the bell is a phenomenon which Prof. Jones has been studying for many years. He has performed an interesting series of experiments with the Dorothea Carlile Chime at Smith and another with the Harkness Memorial Chime at Yale. He believes now that the "strike note" of the bell is really a whole octave higher than you think it is.

The making of bells is at present to a surprising extent a matter of luck. A generally effective shape has been found and certain proportions have been worked out so that if you make a bell, like the biggest one in the Harkness Chime for instance, about five and three-quarters feet high by seven feet broad, it will ring F sharp below middle C, and if you make another bell half as high and half as broad and half as thick, it will ring the F sharp above middle C. But sometimes an F sharp bell has a sweet tone and sometimes a very harsh and unpleasant one. That is because we have not yet learned how to control the "overtone." "Turning," cutting many lines about a bell at different heights, often improves the tone; but how much should you cut and where?

You know that when you pluck a violin string you hear not only the fundamental note to which it is tuned but a number of other overtones or "partial tones" as they are called. The same thing happens when you blow into a flute. A bell too has partial tones though their relation to each other is different. If you put a tuning fork tuned to E against a violin, the E string will begin to vibrate in sympathy. But if you have a bell that rings E seldom will your tuning fork or anything else get an E out of it. The fifth "partial tone," however, is high E, a whole octave above the tone you hear.

Psychology enters into this, Prof. Jones thinks, as well as physics. Like an optical illusion, perhaps, there is some sort of aural illusion about the performance that makes the high E, blurred by the other lower partial tones, sound to you like E an octave lower. No one has yet explained this problem in psychology and the solution of the problem in physics is by no means complete. Prof. Jones is inclined to feel, however, that he is so close to the right track that if some one would give him a bell foundry to experiment with he would be able to tune the bells pretty accurately.

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A "Male" Hen Pheasant

Physiology

A beautiful ring-necked pheasant which first laid eggs and later assumed male plumage paid the penalty for its idiosyncrasies with its life and now is one of the collection of mounted birds in the museum at Marysville, Calif.

During its lifetime of about eight years this strange bird laid about 280 eggs, many of which were hatched under a bantam hen, as the pheasant would nest only occasionally. Suddenly in 1926 she quit laying. From that time on she began to display an abnormal plumage, commencing at first with flecks about the head, then a ring on the neck, feathers on the crown, neck, and back changing to those of the male, a well-developed ring around the neck, tail elongated and barred, rump feathers, breast and underpart the same as the male bird. To all appearances she was an immature male, except that there were no signs of comb, gills, or pouts feathers from the ears.

Then the bird was killed in the interest of science and an examination of the body made by W. F. Peacock. It was found to be very fat; vital organs seemed to be normal. An examination revealed that the ovaries were completely atrophied, not a semblance remaining.

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All of the resources of Science Service, with its staff of scientific writers and correspondents in centers of research throughout the world, are utilized in the editing of this magazine.

Skeletons in Armor Revealed by Digging

Archæology

By Emily C. Davis

The famous battle of Visby, July 27, 1361, about which history says so little and legend says so much, is at last being understood as the result of scientific investigation at the site of the battle.

Legend declares that when the Danish King Valdemar III wanted to besiege the prosperous and strategic city of Visby, capital of the Island of Gothland, he first went disguised as a merchant to the city and laid siege to the heart of a romance-seeking maiden, the daughter of a prominent goldsmith. Foreign merchants were an everyday occurrence in the busy trade centers of Visby, and the spying king was unsuspected. The goldsmith's daughter, captivated by the merchant's love-making, discussed with him the strong and weak points of the island's defenses, whereupon the merchant sailed away on business.

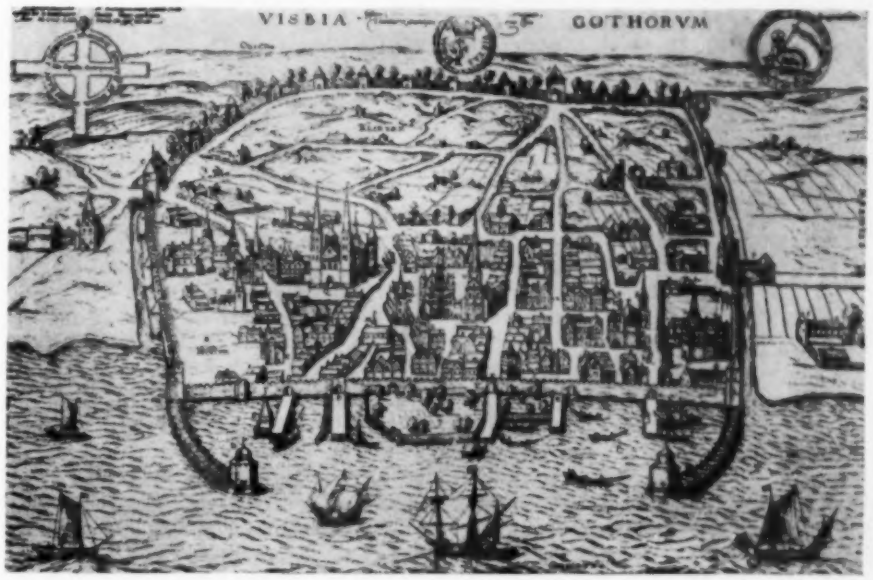
In due time he returned—with an army—and the island and its capital city fought for their existence. Legend says that the meadow outside the walls of Visby ran red with blood. Even in the streets blood flowed in torrents as far as the Baltic Sea, which was thereby colored red. When Visby fell, the conqueror Dane broke a gaping hole in the city wall and rode through instead of entering by the gates. Legend also says that Valdemar gave no more thought to the goldsmith's daughter, but took interest only in having three huge beer vats set in the market square, with orders that they be filled with gold and silver before sunset lest the city be burned as forfeit.

The unhappy goldsmith's daughter was identified as the cause of the city's downfall, and was walled alive in a tower, the Maiden's Tower, which can be seen by tourists at Visby to this day.

How much of this is fact and how much poetic inspiration has remained a mystery. No event has been more richly woven into romantic tales in all Gothland's eventful history. But the story has remained one for story-tellers, handed on by word of mouth, added to and embroidered until no one can say where fantasy ends and history begins.

At some time or other a stone cross was set up in the meadow to mark the battlefield and the date. In terse Latin it says:

"In the year of our Lord 1361 on the twenty-seventh of July, there fell before the gates of Visby at the hands of the Danes the Goths here buried; pray for them."



VISBY in its glory, shown on an old map

No one knows when the cross was carved and placed there, or by whom. But the stone holds the only written record of the battle, except for the bare historic facts that the Danish king did besiege Visby and plunder it.

But now archaeologists have dug into the field outside the walls and have found there remarkable evidence in proof of a dramatic siege. Dr. John Nihlen, well-known Swedish archaeologist, who has just visited this country, said that last summer there have been unearthed at the battlefield the skeletons of hundreds of fighters who were killed and buried in huge common graves.

Here lie the bodies of warriors in chain mail, rare survivals of medieval armor, for chain mail is one of the durable looking objects that has vanished almost entirely since its day. Here are bodies not only of strong fighting men, but also of women, cripples, children, the last defense of the city's militia. Those that died were buried hastily, fearfully, for the weather was hot and there was alarm that plague might add its terrors to those of siege.

It was not until 1905 that archæologists first set to work to see what could be done to dig up the unwritten history of the encounter. The Swedish archaeologist, Dr. O. V. Vennersten, who conducted the first investigation, assumed that the battle raged where the memorial cross stands, and there he began to dig. It was soon shown that he was correct in his calculations, for a tremendous common grave was opened, and skeletons in armor began to be discovered. By different stages the excavations have since been continued, with many difficulties. The fallen soldiers were tossed down into the common grave helter skelter, in the most disconcerting disorder. Since there had been no time for regular funerals, only big pits had been dug, and in these the dead had been thrown without even the removal of their armor. To extract any of these skeletons and their rare medieval armor from the swampy earth proved an exceptionally delicate task, and yet one for a sturdy constitution. Only hardy workers could endure the digging, for the earth formed by the decay of organic material and the naturally moist earth spread an almost unbearable stench.

After 1912, sixteen years have gone by without further investigations of Visby field until this past summer, 1928, when Dr. B. Thordeman set to work with newer and highly improved methods with brilliant results.

Hundreds of new skeletons have been found, and medieval military equipment and weapons have been unearthed, Dr. Nihlen stated. And an excellent survey of the huge war grave can now be obtained.

"Some of the rich finds have already been examined in museums and laboratories," he (*Turn to next page*)

Skeletons in Armor Unearthed by Digging—*Continued*

reported. "In this connection a Swedish scientist, Prof. E. Clason, has done the principal work and through him we have obtained numerous interesting details of the encounter which for so many years has occupied popular fantasy and legend makers.

"The soldiers involved were apparently well equipped. Around the skeletons of several of them were found coat-of-mail hoods which are still well preserved after five centuries, but which were not sufficient to protect their wearers. Around the shrunken skeletons it was also possible to discern chest plates and well-forged iron bands, coat-of-mail sleeves, and armored gloves. In this way an excellent opportunity is offered for studying more closely the military equipment of the Middle Ages, about which previously little has been known.

"Of weapons only a few have been discovered. These it had been obviously impossible to save before the corpses were thrown down into the common grave. A few arrow-heads of iron have been found. These were embedded in the skulls so deeply that it had not been possible to extract them quickly during the battle and therefore they had been allowed to remain in the bodies.

"Many of the skeletons taken from the muddy grave were fearfully mutilated. Broken bones furnish clear evidence that the fight was conducted with a high degree of fury. On one skull it was possible to count as many as fifteen wounds, on another thirteen. In many instances noses had been cut off. Sometimes ears were cut so close to the skull that traces of the cuts could be seen in the bones. On the lower extremities there were a great number of cuts. They had apparently been the least protected parts of the bodies. A mortal combat between embittered enemies—that is what the remnants here found give witness of."

Some curiosity has been expressed as to whether the bodies found here are those of the Danes or of the native Gothlanders. All the clues indicate that it is the remnants of the defeated inhabitants which have now been brought to light.

"Inquiries of Prof. Clason in this respect have been of great significance," Dr. Nihlen said. "Through his examination of the skeletons he has been able to demonstrate that among the bodies buried here at least nine were women, and furthermore a large number were cripples and invalids. He has also proved that almost a third of the 130 individuals which he examined were the skeletons of either aged people or else the very young. This army, whose fallen were buried near the cross outside Visby, had an odd make-up. In addition to men capable of bearing arms, it was composed of old men and boys, cripples and women. This could hardly be the mighty Danish army which had landed a few days before under the command of King Valdemar. What has been discovered under this battlefiefild is therefore nothing but the remnants of the militia hastily gathered when the Danish invaders landed on the island."

That the weak, the old, and the lame should have gone out against the Danish king is evidence that the struggle was as bloody and desperate a fight as the legend has insisted. It was a bitter cup for the Gothlanders that the Danish king should add King of Gothland to his title. But the title was as eagerly coveted by Valdemar on his side, and he had reason to fight desperately for it.

The island of Gothland has been called by historians the Crete of the Baltic, because during several centuries of the Middle Ages Gothland occupied the same high cultural and political rank in Northern Europe as Crete once held in the Eastern Mediterranean. Trade, above all, gave Gothland its position of power. The great trade routes between the Orient and the west had here in the Baltic Sea one of their most important meeting points. During the Viking Age, from about 800 to 1050 A. D., nearly every farmer on this island was a ship owner, and with his own boats made trade expeditions to foreign ports. But during the Middle Ages, from 1050 to 1500 A. D., the only city on the island, Visby, gathered all these lines of trade into its own hands and became one of the leaders of the Hanseatic League.

It was inevitable that the powerful cities of the trade league should have enemies, and Visby had many. One of the most virulent was the powerful Valdemar, who made the daring resolution to crush Visby forever. His encouragement to his soldiers when he set out on this mission is said to have been that he would lead them to a place where there was gold and silver aplenty, and where even the pigs ate out of silver troughs. With his large and eager army he sailed to the island and defeated the hastily collected peasant army, unused to battle tactics.

Visby surrendered, and saved its homes and shops and churches from the flames by stripping them of their treasures to meet the conquerer's demand. The beer vats were filled by sunset, as required, but when Valdemar withdrew he put Danish governors over the island.

Even then Visby was not completely crushed, but her commercial prosperity had suffered a mortal blow. Her wealth had been shown to be but feebly protected against marauders, and her people brave but helpless in time of emergency. The losses caused her strength gradually to ebb away.

While the Danish king sacked Visby, his subordinate officers treated the other settlements on the island in a similar manner. An inscription in a church at Fide in the southern part of Gothland summarizes the events of the day in Latin as pithy as a modern headline: "The temple has been burned, the people slain, and fall wailing before the sword."

Finally, Valdemar gathered his warriors and leaving probably more than a thousand dead Gothlanders, he set sail for his home country with his coveted hoard of gold and silver. But accounts state that a storm arose at sea and his ships sank still laden with their heavy treasure. Valdemar himself escaped.

An incident which occurred during the excavations in 1912 has gone down into the modern record of Visby's most famous battle. The digging at the battlefield attracted the special interest of the German Emperor, William II, who that year visited the island. It is said that the Emperor came to visit the excavations on a day when an entire heap of skeletons had been revealed and one could see grinning death's heads inside of rusty helmets, as well as chopped off legs and other mutilations.

The scientist in charge, Dr. Vennersten, immediately placed himself at the disposal of the Emperor and explained the finds. As he pointed out the various details he decided to give the Emperor a lesson from the past, and said:

"Here you see, your Majesty, how frightful are the consequences of war. I hope you will remember."

Onlookers expected that the Prussian ruler would become angry, but instead he broke out into laughter and made a humorous little speech in reply. As a proof of his thanks for the lesson he awarded a decoration to the brave Swedish archaeologist.

"Surprise Ships" May Change Fashions

Naval Architecture

The new high-efficiency German warships of the "Ersatz-Preussen" class, whose appearance has caused a good deal of a buzz in European naval circles, may force some radical changes in battleship and cruiser fashions. Medium-sized, fast ships armed with 12-inch guns, favorite caliber of pre-war days, may replace some of the huge floating fortresses like the "Nelson" and the "Maryland," with their 16-inch armaments.

This possibility is discussed by the editor of *The Engineer,* leading British technical publication. The German ships, with their 26-knot speed, can easily run away from any existing ships big enough to sink them, except for four big battle cruisers in the British Navy and four in the Japanese. Other navies have plenty of cruisers fast enough to overtake the German ships, but the 11-inch guns carried by the latter would make such a proceeding suicidal. Therefore, the Continental admiralties, especially the French, are considering whether it would not be wise to meet this new type of construction with a "medium-sized battle-cruiser" of about 17,500 tons, armed with guns of 12-inch caliber. There were battle-cruisers of this general description in the British navy before and during the war, but they were scrapped in accordance with the Washington treaty.

The editor of *The Engineer* is even inclined to back the smaller caliber gun against the 15- and 16-inch monsters as practical weapons under ordinary conditions of sea fighting.

"We are often invited to consider the tremendous effect of a well-aimed salvo from the 16-inch guns of the 'Nelson', each of the projectiles weighing roughly a ton," he comments. "Without doubt, a direct hit by even one of these levin-bolts would prove very destructive, but would it do more damage than the impact of two 13.5-inch or three 12-inch shells? War experience suggests a negative answer. If that be so, a strong case could be presented for the smaller gun, which could probably fire twice as rapidly as the 16-inch. In other words, a vessel training ten 12-inch guns on the broadside would be able, within a given period, to deliver a volume of fire but little inferior in weight to that of a vessel with nine 16-inch guns, and, other things being equal, the more numerous guns would register more hits."

It is not expected that naval construction in the United States will be seriously affected by the new proposals in Europe. American designers have always tended to mount the largest number of heavy-caliber guns compatible with efficiency in other directions. But the editor argues against following the American example in this.

"There is good evidence that the American replacement ships planned for 1931 will be designed up to the Treaty maximum of 35,000 tons and mount ten 16-inch guns. The appearance of such mastodons would doubtless provide a strong, if superficial argument for the building of similar ships for the British Navy. We hope, however, that our naval directors will take a broader view, and not allow themselves to be drawn into a tonnage and gun-power competition which bears no actual relation to British requirements."

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Radium Reduces Fire Risk

Physics

Radium now fights fires by snuffing out dangerous sparks of static electricity in a large Russian rubber factory. So little radium is used that the method costs only a few dollars per year.

When rubber solution is flowed upon a fabric base and dries upon it, enormous charges of static electricity are produced from friction of the rubber-covered fabric against parts of the drying machinery. In time the pressure of these accumulated charges is raised so much that a breakdown through a discharge becomes inevitable. The hot, fat spark, exactly like the ignition spark in an automobile motor, presents a great fire hazard. Air in the drying room of a rubber factory is always saturated with highly explosive vapors, which ignite most readily.

The usual method of fire prevention consists of leading the charges of electricity away before their pressure becomes too high. A fine wire-brush is used to collect the charges. Small sparks cannot be avoided in this way, however, and the fire danger is always present.

All this is changed when radium is placed near the point where electricity is generated. Radium rays ionize the air and make it a good conductor of electricity. The dangerous charges then flow harmlessly through the air to the nearest metallic part and thence to earth. No sparks can be produced, when radium is on sentry duty. The new method was tried out in the Russian State Rubber Factory "Treugolnik" at Leningrad and was found to be successful.

The cost of installation is reported to be very low, as one milligram of radium is quite sufficient to produce the desired results. Furthermore, it will not be necessary to renew the radium capsule, as it will last for a few centuries at least.

Science News-Letter, March 23, 1929

In a list of 13,500 American scientists, more than one-fifth are chemists.

New Zealand has a suicide rate considerably higher than that in Great Britain.

Toy Train Obeys Voice

Electrical Engineering

A toy electric train that obeys the spoken words of its master to go, stop or back, is one of the latest achievements of the General Electric Company's Research Laboratory.

The locomotive is named Casey Jones, and by saying "Go ahead, Casey," the train starts. "Stop" brings it to an immediate halt, while "Back up!" causes it to do just that.

The secret of operation lies in a special selector, connected through a vacuum tube to an ordinary telephone transmitter through which the orders are given. This determines the polarity of the rails in the track, and the polarity in turn determines whether the train goes forward or backward. Three or more syllables operate the relay and the selector to provide forward movement. A two syllable order reverses the polarity and the train, while one syllable breaks the circuit.

Future applications of the device are seen in elevator controls, that will respond to the spoken word, or a furnace door that will open or shut in response to spoken commands over a telephone at the bedside.

Science News-Letter, March 23, 1929

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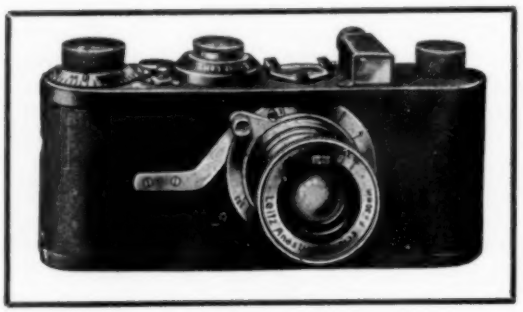

A Leica is now with the Byrd Antarctic Expedition. Mr. Nicholas Haz, F. R. P. S., who has at his command practically every type of camera, has found many uses for his Leica. Mr. Willard D. Morgan, noted writer, traveler and photographer, adds his name to the long list of well-known owners of Leica Cameras.

Each recognizes the versatility, the ease of operation and the compact usefulness of the Leica. Each appreciates the marvelous workmanship, accuracy and precision of this remarkable camera.

Technically, the reasons for the popularity of the Leica are many. It is the smallest roll film camera with a focal plane shutter. Equipped with a Leitz Anastigmat F.3.5, 50 mm. lens with speeds of 1/20 to 1/500 seconds. Weighing less than a pound it can fit in a vest pocket with ease. On one load of standard cinema film, it will take 36 pictures of double frame size, from which enlargements up to 12"x18" may be made without loss in definition or detail. Positive film made from negative for screen projection.

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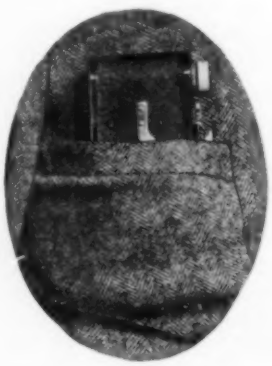

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No Danger in State Medicine

Medicine

The dread ogre of physicians, socialized or state medicine, was brought into the light, examined and shown not to be so fearful after all, at the dinner of the Board of Counsel of the Milbank Memorial Fund. Practical steps for a solution of the great controversy of public health vs. private practice were presented by a physician, Dr. James Alexander Miller.

Dr. Miller advised his fellow physicians to acquire a broader outlook on public problems and to consider the matter of the public health as well as the curing of individual patients. At the same time, health departments and other health organizations were advised to enlist the aid of private physicians in putting over their health programs, rather than to spend public funds for work that rightfully should be done by the private physician for the people of his community.

The sympathetic individual touch that exists between doctor and patient is important and should be saved, Dr. Miller declared. Clinics and dispensaries, insurance companies and health departments cannot give this, although they can do much good work. However, from the ranks of practicing physicians are arising men who have not lost touch with individual, curative medicine, but who have also interested themselves in preventive medicine. Such men, leaders in their profession, will become connecting links between the medical profession and the public and private health organizations, Dr. Miller prophesied.

"The growing knowledge of causation of diseases has forced preventive medicine into the foreground," said Dr. Theobald Smith. Research has become the fountain head of advances in both curative and preventive medicine, he pointed out in a discussion of how research (*Turn to next page*)

Mexico to Hold Workers

Sociology

While United States authorities are occupied with the case of the Mexican worker in American fields and factories, the Mexican government on its part is investigating the home angle of the problem and devising means of keeping the emigrant at home.

In the last century and a half, while the population of the United States has increased more than forty fold, that of Mexico has hardly quadrupled, and Mexico is as anxious to keep her nationals at home as some American groups are to keep them out.

Dr. Manuel Gamio, who has made a study of the problem, has already pointed out that Mexican emigration is a modern movement, but one which has worked so fast that it could practically empty the country in another 50 years if nothing stopped it.

Unemployment and economic misery at home are back of the migratory movements, and one of the first recommendations of experts working in the Mexican Department of the Interior, according to an announcement of Minister Felipe Canales, is to stop the entry of Slovenes, Italians, Albanians, Hungarians, and groups that form undesirable competitors of the Mexican at home, or those that use the country merely as a stepping stone to the United States. (*Turn to next page*)

Device Aids Cleft Palate

Surgery

A new device which successfully overcomes the thick, sometimes unintelligible speech of persons afflicted with cleft palate has been made by two Viennese scientists, Dr. Albert Schalit and Prof. Emil Froeschl. The new device was recently demonstrated to the Vienna Medical Society by a dialogue between a normal person and one afflicted with cleft palate treated by the new method. Physicians present were unable to tell which of the two speakers was the sufferer. The device is based on a new theory held by the two scientists about the cause of speech difficulties in cases of cleft palate.

This condition is relatively one of the most common deformities arising out of abnormal development of the human body before birth. It occurs in about one in every 1,000 births. Cleft palate is in most cases complicated by harelip. It consists of a gaping palate which, lacking the roof of the normal one, brings the interior of the nose into direct communication with the mouth. While the harelip can be easily handled by a simple operation, the cleft palate is very difficult to correct by surgical means. Even if the closing of the palate is successfully accomplished, the chief difficulty, inability to produce articulate speech, is not overcome by the operation.

Many attempts (*Turn to next page*)

Whooping Cough Danger

Medicine

Whooping cough still ranks as a deadly disease, in spite of efforts to check it. The general belief that it is merely an annoying but necessary evil of childhood is all wrong. Scientists and public health officials are warning mothers not to take it lightly and to be ready to guard their children against the usual spring and summer outbreaks.

"No other common infectious disease of childhood takes so large a toll of life among children under two years of age," said Dr. Matthias Nicoll, Jr., New York State Commissioner of Health. Whooping cough is dangerous in itself and also because it is frequently followed by pneumonia and tuberculosis.

Various vaccines and sera for preventing the disease have been developed. None of them has been entirely satisfactory, although some physicians have reported success with them. One of these which does not entirely prevent the disease does reduce its severity and the fatalities resulting from it, and is recommended by health officials. (*Turn to next page*)

Synthetic Diet for Plants

Botany

Feeding plants on a synthetic chemical diet will be achieved long before human beings are in a position to subsist on concentrated synthetic foods, Dr. W. S. Landis, vice-president of the American Cyanamid Company, indicated here in a communication to the American Institute.

In fact that day of pure chemicals as plant nutrients has already arrived through the use of concentrated chemical fertilizers. Synthetic nitrogen chemicals, such as cyanamid, urea and nitrate of lime, are blended with other chemicals, such as ammonium phosphate, potassium phosphate, potassium nitrate and other like combinations that place in the fertilizer nitrogen, phosphate or potash in a form that plants can assimilate. Plants can not live on these chemicals alone, as small quantities of manganese, zinc, vanadium, titanium and many other elements are needed, besides carbon dioxide and water, from which the bulk of plant foods are manufactured by the plants themselves.

"The future fertilizers will be much more concentrated in the three common plant foods than even past history would lead one to suppose," said Dr. Landis. "The older organics of animal (*Turn to next page*)

Whooping Cough—*Cont'd*

The best prevention still consists in keeping children away from those who have whooping cough. This is difficult because the characteristic whoop does not develop until a week or more after the onset of the disease. Consequently one must keep the children away from those who have colds or coughs to be safe.

Reduction of whooping cough has lagged far behind reduction of other communicable diseases chiefly because of the popular attitude that it is not a serious disease.

"Deaths from whooping cough occur just as often as they di' or 30 years ago," stated Dr. Nicoll.

The cause of whooping cough is generally accepted as being the Bordet-Gengou bacillus, named for the two Frenchmen who isolated it in 1906. It has been the basis of most of the attempts to produce an antitoxin or preventive vaccine.

Ultra-violet and X-rays, alkalis, blood serum and even ether have been used more or less successfully in the effort to find a cure or preventive of the disease.

Science News-Letter, March 23, 1929

Synthetic Diet—*Cont'd*

or vegetable origin will disappear to still greater extent and will be replaced by newer synthetic salts mostly of inorganic nature. Process limitations existent today will disappear in so far as they eliminate essential plant foods and the science of compounding will be greatly elaborated as we acquire better knowledge of plant requirements and soil deficiencies."

Science News-Letter, March 23, 1929

A new artificial wool process has been patented in France and is creating international interest.

The practice of washing apples and pears before shipping them to market is becoming general in the Pacific Northwest.

The little gorilla now at the National Zoological Park, in Washington, is the eighth gorilla to arrive in America.

At a recent London conference on street noises, the topic of liveliest interest was what kinds of automobile horns are objectionable.

Agricola, famous sixteenth century mining expert, declared that the divining rod was a useless device.

State Medicine Not Dangerous—*Continued*

has brought the practice of medicine and public health activities into closer relationship. While the conflict between the two wings of medicine is natural, both wings are really needed by the public, he said. The physician is the outpost for the public health officer, discovering new diseases and their cause and new means of treating and preventing them. Health demonstration programs may be considered as a kind of research experiment in themselves in proving how good our knowledge of disease prevention is.

The demonstration program sponsored by the Milbank Fund has given the world knowledge of the machinery needed to suppress certain diseases in a community, declared Dr. William Charles White of the National Research Council. He added that the latest feature of the demonstration has been the development of a means of evaluating the methods used in health demonstration work, so that they may be arranged according to their relative importance. This has been done through statistical studies carried out by Edgar Sydenstricker, formerly statistician of the U. S. Public Health Service.

A mere desire on the part of the county medical society to develop or guide the public health activities of the county is not enough to accomplish anything, Dr. Linsley Williams observed. An effective course, as developed in New York, is to have one member of the society devote a large share of his time to ascertaining the facts in regard to the particular activity the society wants carried out. This individual can then advise the local health department with a good chance of achieving results. Frequent meetings between the state medical society, state health department and state lay organizations have also been valuable in New York, Dr. Williams said.

Science News-Letter, March 23, 1929

Cleft Palate—*Cont'd*

have been made to correct this defect by inserting devices into the mouth but so far they have failed. Dr. Schalit and Prof. Froeschl found that the thickness of articulation is caused not so much by the fissure of the palate as by the resonance of the open fissures of the nose. Dr. Schalit did not bother with attempts to close the palate surgically but inserted a wedge-shaped piece into the nasal cavity, which completely closes it from the mouth. To this part, other necessary minor parts are fixed.

Science News-Letter, March 23, 1929

Ultra-violet rays are the main cause of fading in paintings, a lighting expert says.

Turquoise was mined extensively in ancient times because it occurs near the surface and is readily cut and polished.

The distance around the earth at the equator has shrunk at least one and one-half miles in the past century, says a German astronomer.

Among Indians of the southwest, the pumpkin blossom holds a place in legends somewhat like that of the lotus in Oriental lore.

Twenty-eight states have completed the marking of highways in accordance with the standard signs approved by federal road experts.

Mexican Workers—*Cont'd*

Statistics now being gathered on unemployment, indicate an abnormal concentration of population in cities and other centers where means of livelihood are scarce, and a practical desertion of rural regions where resources are frequently abundant, but where the population concentration is at times as low as one inhabitant in each hundred square kilometers.

This desertion of the country for the city has decreased the cultivation of the earth and the exploitation of its resources, and forms a problem that confronts the nation. A plan for the cooperative exploitation of natural resources by groups of workers and unemployed is now being worked on by the Minister of Industry, Commerce and Labor Ramon P. de Negri.

Such a plan would not only provide work at home for Mexicans who might otherwise emigrate to the United States, but could otherwise help to initiate an era of Mexican national enterprise such as is now practically nonexistent. Minerals, oil, coffee, sugar, banana, cacao and other of Mexico's sources of wealth are today almost exclusively exploited by foreign interests, and do not therefore form the powerful stabilizing force on national politics as is the case when industries are national.

Science News-Letter, March 23, 1929

Record Meteor

Astronomy

The 70-ton meteor reported from South Africa is the world's largest actually discovered, though it is probably dwarfed by the one which many years ago caused the famous Meteor Crater in Arizona. This is the opinion of Dr. George P. Merrill, meteor expert of the U. S. National Museum. The great meteor which fell in the Yenissei Province of Siberia on June 30, 1908, was also probably much larger, but as yet the main part of neither of these has been located. Another huge crater, due to a meteor that fell some time in the past, was discovered in the Pamir, in central Asia, near Afghanistan. This latter crater is a conical pit 200 feet in diameter and 33 feet deep.

The 1908 Siberian meteor is probably the largest that has ever struck the earth. The region of the fall is over a mile in diameter in a marshy region. The ground is pitted with deep funnels from 50 to 100 feet in diameter, so that probably the meteorite, with a weight estimated at half a million tons, burst to pieces, bombarding the earth with fragments. At the towns of Kerensk and Ilimsk, 250 miles away, great detonations were heard and pillars of smoke and fire were seen. Railroad officials at Kansk, 400 miles distant, felt the air wave and heard a roaring sound, while the seismographs at Irkutsk, 900 miles away, detected the vibration of the earth when it hit.

Though no human being happened to be in its path, one herd of 1,500 reindeer belonging to a farmer was annihilated. Only a few scorched carcasses remained. Houses were badly damaged, and metal utensils were melted. Trees on surrounding hills were scorched and knocked over. An expedition sent out by the Soviet Government studied the general character of the region. Later borings will be made for pieces of the actual meteorite.

This is the first authenticated instance of a meteorite that did damage to man or animals. It is fortunate that it fell in such a sparsely settled region, and not in a large city, like New York or London.

The South African meteor is reported to have been found at Otjihaene, near the head of the Grootfontein railway in the northeastern part of Southwest Africa. Imbedded in soft limestone, its approximate size is 10 by 10 by 4 feet.

Science News-Letter, March 23, 1929

Nature Ramblings

By Frank Thone

Natural History

Yew

"What of the bow? The bow was made in England,
"Of true wood, of yew wood, the wood of English bows."

To those of us who were nourished on the robust romantic fiction of the nineteenth century, the word "yew" is English rather than American; it brings up pictures of an old bowyer shaving at a seasoned stave from the parish hedge, and the terrible hail of arrows sped by the English archers at Agincourt. And indeed the yew as a tree is English and European rather than American, for the native species of yew is confined to the northern fringe of states and never reaches the proportions of more than a straggling shrub. Even the American yew is mainly a British-American plant, for its principal range is in Canada, and its botanical name is *Taxus canadensis*

The yew hedges popular in some parts of the United States are not of the native species, but of the stifferstemmed European yew. Though admirably adapted for hedge purposes, its use as such is in part an interesting anachronism; for the cultivation of yew hedges was encouraged in England in the first place as a means of insuring a good supply of the long, tough-fibered, springy bow-staves that served England so well in the heroic days of the Plantagenet kings. The hedges outlived their utilitarian days, and were transplanted to the new world by the early colonists.

In the sentimental "language of flowers" of a past generation, the yew was considered the plant of penitence, probably because of the dark green of its foliage and its frequent use as a hedge around churchyards.

Science News-Letter, March 23, 1929

Earthquakes are most frequent in September.

Infantile Paralysis Cure

Hygiene

The best hope of curing the paralysis and serious crippling which follow an attack of poliomyelitis, or infantile paralysis, lies in early preventive measures, Dr. Lloyd W. Aycock of the Harvard Medical School declared in an analysis of the disease. This means that treatment must be begun before the nerve cells have been destroyed. Hence the plea physicians are making for early diagnosis of the disease.

"The paralysis is due to the destruction of the nerve cells in the spinal cord which govern the movement of muscles," said Dr. Aycock. "When these nerve cells are destroyed, the muscle with which they are connected loses entirely its power to function. It is like a telephone which may be in perfect order itself but which cannot function without a wire leading to it from the telephone exchange."

Once the paralysis has occurred, it is too late to cure it, although patient treatment and care and exercise can do much for the affected muscles. The paralysis is practically always preceded by certain definite symptoms. It is during this preparalytic stage, before the nerves have been destroyed, that there is a chance of cure.

Serum from the blood of persons who have passed through an attack of the disease is (*Turn to next page*)

Survey Confirms Hoover

Hygiene

President Hoover's inaugural address statements on public health have been confirmed by the survey just made of the health services in Cattaraugus County, N. Y., and reported by Dr. Reginald M. Atwater, county health officer.

The President pointed out that many sections of our country and many groups of citizens suffer from diseases, the eradication of which are mere matters of administration and moderate expenditures. The returns are a thousand-fold in economic benefits and infinitely more in the prevention of suffering and the securing of human happiness, he said.

In Cattaraugus County a health program similar to that described by the President has been carried on for six years with the aid of the Milbank Memorial Fund. The results are found in lowered death rates from certain diseases, (*Turn to next page*)

Infantile Paralysis—*Cont'd*

the one remedy at present available for treating the disease in the pre-paralytic stage.

Mothers are always pretty much doctors to their children, Dr. Aycock said, and while they cannot hope to make a diagnosis of this disease unaided, they can learn to suspect its presence so as to call for medical aid in time.

The onset of the disease is usually abrupt, with fever, headache and stomach and intestinal upset and the child is drowsy and wants to be let alone. The child is usually more prostrated than usual with the degree of fever, which is generally not over 102 degrees Fahrenheit. An anxious expression of the face, tremors and twitchings of the muscles and a sort of uncertainty in movement of the arms and legs are characteristic of this disease in the early stages.

The most suggestive sign is stiffness of the spinal column and neck. The latter will be held rigidly and often the child cannot sit up comfortably without propping himself up on his arms.

Every stiff neck is by no means an indication of infantile paralysis, Dr. Aycock emphasized. The stiff neck of this disease is a rather special one. But if the mother finds such symptoms, she should at least suspect the disease and have the matter further investigated.

Science News-Letter, March 23, 1929

Health Survey—*Cont'd*

in lower infant death rates, in better school health and in the improved facilities throughout the community for the protection of the health of each individual living there.

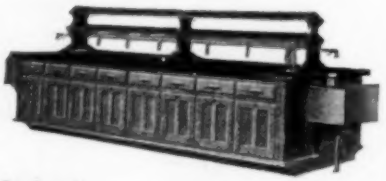
Most important of all is the new attitude of the public toward health, both public and personal. Now the people of Cattaraugus County are beginning to realize that prevention of disease is really better than cure.

"A hundred years hence our generation will seem to have been remarkably slow to realize this fundamental fact," Dr. Atwater declared.

Science News-Letter, March 23, 1929

A baggage car for automobiles has been added to a fast California train to enable travelers to take their cars with them conveniently.

After a severe storm last winter, the Ashtabula Lighthouse on Lake Erie was encased in a solid mass of ice two to five feet in thickness.



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CLASSICS OF SCIENCE: Galileo sees the Phases of Venus

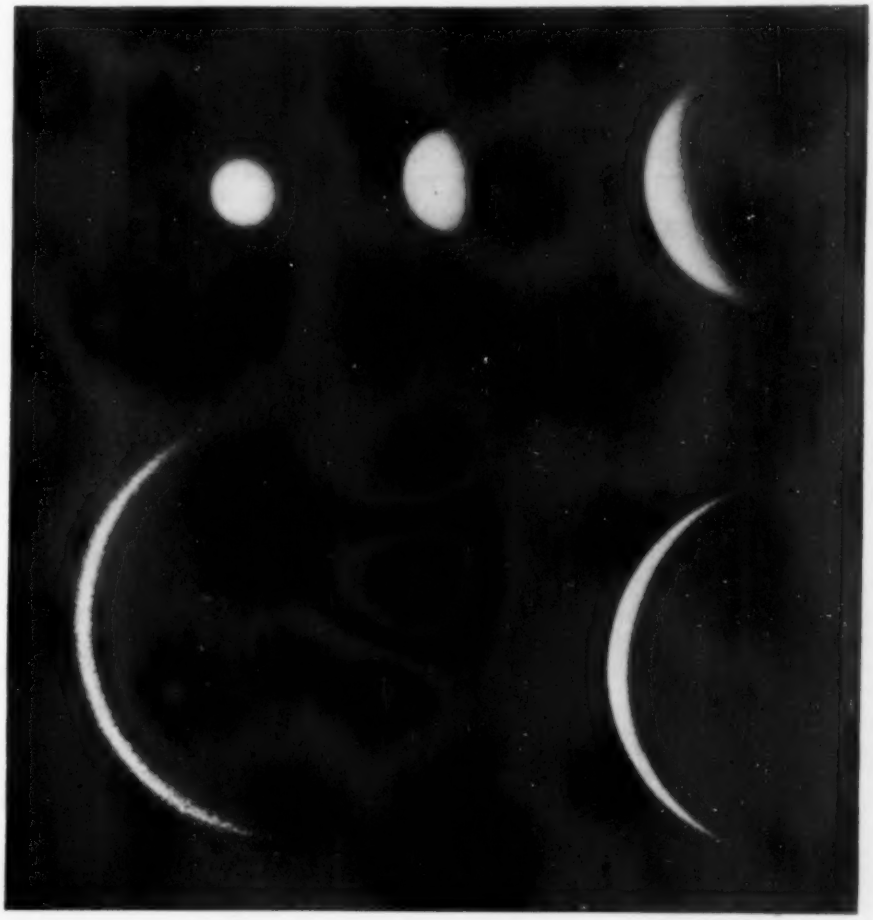
Astronomy

Venus is the lower and more brilliant of the two planets shining near the horizon in the western evening sky. The other is Jupiter. Venus is brightest when near the earth, in spite of the fact that it appears then in crescent phase. At present it looks through the telescope like the lower right-hand picture. It is very difficult to observe the phases through an ordinary field glass, although, with a powerful glass clamped solidly, it is sometimes possible to see that the image is not a perfect disk. The Classics Editor would be glad to learn from any amateur who has seen Venus' phases the conditions of observation and the power of his glass.

DIOPTRICS, by Johann Kepler, (Galileo's letter quoted in the Preface), Augsburg, 1611; *translated by Edward Stafford Carlos, London,* 1880.

Letter from Galileo

"It is time for me to disclose the method of reading the letters which some weeks since I sent you as an anagram. It is time now, I mean, after I have become quite certain about the matter, so much so that I have no longer even a shadow of doubt. You must know then that about three months ago, when the star of Venus could be seen, I began to look at it through a telescope with great attention, so that I might grasp with my physical senses an idea which I was entertaining as certain. At first then you must know the planet Venus appeared of a perfectly circular form, accurately so, and bounded by a distinct edge, but very small; this figure Venus kept until it began to approach its greatest distance from the sun, and meanwhile the apparent size of its orb kept on increasing. From that time it began to lose its roundness on the eastern side, which was turned away from the sun, and in a few days it contracted its visible portion into an exact semicircle; that figure lasted without the smallest alteration until it began to return towards the sun where it leaves the tangent drawn to its epicycle. At this time it loses the semicircular form more and more, and keeps on diminishing that figure until its conjunction, when it will wane to a very thin crescent. After completing its passage past the sun, it will appear to us, at its appearance as a morning star, as only sickle-shaped, turning a very thin crescent away from the sun; afterwards the crescent will fill up more and more until the planet reaches its greatest distance from the sun, in which position it will appear semicircular, and that figure will last for many days without appreciable variation. Then by degrees, from being semicircular it will change to a full orb, and will keep that perfectly circular figure for several months, but at this instant the diameter of the orb of Venus is about five times as large as that which it showed at its first appearance as an evening star.



THE PHASES OF VENUS as shown in a series of photographs made at the Lowell Observatory, at Flagstaff, Arizona. All these pictures are on the same scale, the planet appears larger when in the crescent phase because then it is about 120,000,000 *miles nearer to us*

"From the observation of these wonderful phenomena we are supplied with a determination most conclusive, and appealing to the evidence of our senses, of two very important problems, which up to this day were discussed by the greatest intellects with different conclusions. One is that the planets are bodies not self-luminous (if we may entertain the same views about Mercury as we do about Venus). The second is that we are absolutely compelled to say that Venus (and Mercury also) revolves round the sun, as so also all the rest of the planets. A truth believed indeed by the Pythagorean school, by Copernicus, and by Kepler, but never proved in the case of Venus and Mercury. Kepler therefore and the rest of the school of Copernicus have good reason for boasting that they have shown themselves good philosophers, and that their belief was not devoid of foundation; however much it has been their lot, and may hereafter be their lot, to be regarded by the philosophers of our times, who philosophise on paper, with an universal agreement, as men of no intellect, and little better than absolute fools.

"The words which I sent with their letters transposed, and which said,

Haec immatura a me jam frustra leguntur, o. y.

When reduced to their proper order, read thus,

Cynthiae figuras aemulatur mater amorum:

The mother of the Loves rivals the phases of Cynthia: that is,

Venus imitates the phases of the Moon.

Three days ago (*Turn to next page*)

Phases of Venus—*Continued*

I observed an eclipse of the moon, but not anything worthy of special notice occurred in it. Only the edge of the shadow appeared indistinct, blurred, and hazy; the cause of the phenomenon no doubt is that the shadow has its origin at the earth, at a great distance from the body of the moon.

"I have some other particulars, but I am prevented by time from writing about them, etc."

So writes Galileo.

Kepler's Comment

What now, dear reader, shall we make out of our telescope? Shall we make a Mercury's magic-wand to cross the liquid ether with, and, like Lucian, lead a colony to the uninhabited evening star, allured by the sweetness of the place? or shall we make it a Cupid's arrow, which, entering by our eyes, has pierced our inmost mind, and fired us with a love of Venus? For what language is too strong for the marvelous beauty of this orb, if, having no light of its own, it can attain simply by the borrowed light of the sun to such splendour, as Jupiter has not, nor the Moon, though enjoying a proximity to the sun as close as Venus; for if the moon's light be compared with the light of Venus, it will be seen to be certainly greater on account of the apparent magnitude of the moon, but, in comparison with the light of Venus, dull, dead, and leaden. O truly golden Venus! Will any one doubt any more that the whole orb of Venus is wrought most smoothly out of pure unalloyed gold, since its surface, when only placed in the sunlight, reflects a splendour so intense! And here let me add my experiments about the alteration of the light of Venus on blinking the eye, which I have examined in the part of my Astronomy which treats of Optics. Reasoning will be able to conclude nothing else but this, that the orb of Venus turns on its own axis with an exceedingly swift rotation, displaying one after another different parts of its surface which are more or less capable of retaining the sun's light.

Galileo Galilei (1564-1642) had been observing the heavens through his new telescope for about a year when he wrote this letter to his enthusiastic German admirer. The next year, 1611, when Kepler's "Dioptrics" was published, found Galileo in Rome, with his telescope set up in the Quirinal Palace gardens, laughing uproariously at the theological bigots who refused to look through it for fear they might see the sights he described.

Johann Kepler (1571-1630) in 1610 received a present of one of Galileo's telescopes, and set about improving it. He worked out the system of lenses known ever since as the "astronomical" or inverting telescope. Galileo's, which shows the image right-side-up, is now used chiefly in field- and opera-glasses. Kepler published his ideas on telescope making in 1611 under the title "Dioptrics," and in the preface printed the letter from Galileo describing the phases of Venus and his comments on it. In the same year, Kepler lost his favorite child by smallpox, his wife by typhus fever, and his patron by imprisonment and subsequent death. It is a striking illustration of living conditions of his time that only two of his twelve children lived to grow up.

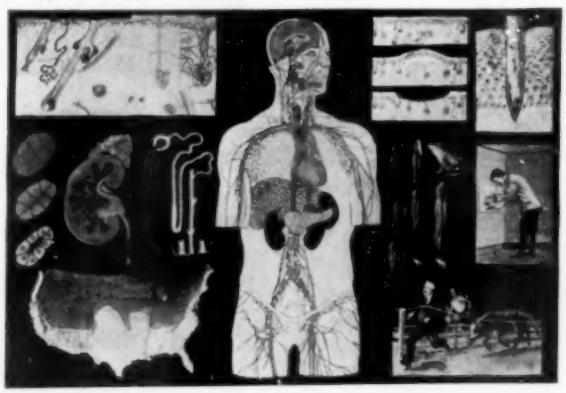
Venus is the second planet from the sun and the nearest to the earth. We see it as "morning star" and "evening star," and it is sometimes so bright that it can be seen by the naked eye in full daylight. Its mean distance from the sun is 67,170,000 miles. Its furthest distance from the earth is 160,000,000 miles, while at its nearest approach it comes nearer us than any other heavenly body except our moon. The diameter, surface, volume, mass and density of Venus are almost exactly the same as those of the earth, which makes that planet a favorite colonizing place with astronomical romancers for adventurous superaviators from our planet. Yet it is doubtful whether such travellers would feel perfectly at home there. Their year is 7½ of our months. The length of the day is uncertain and very difficult to estimate, as the surface is covered with clouds and it is doubtful whether any permanent markings have ever been seen. The abundant atmosphere would be pleasing to an earth-dweller, and the clouds would screen the unpleasant effect of twice as much sunlight and heat as we are accustomed to. But the two possibilities that the surface is entirely covered by water and that Venus always keeps the same face to the sun would ruin the planet according to our ideas of a place to live. Even if these calamities are not true of our sister planet, the fact that the splendor of the heavens, particularly the brilliant spectacle of the earth-moon binary planet so near-by are shut out, would make us feel that the Venus-dwellers are a very insular and narrow-minded race.

Science News-Letter, March 23, 1929

On the average, older children in a family are less intelligent than younger children, an investigation of 1,500 families indicates.

Venezuela is entirely within the torrid zone and has a tropic climate, but the temperature ranges from hot to temperate to cold at the different altitude levels.

A bas-relief panel of lions, unearthed at Beisan, is pronounced by archaeologists the finest sculpture ever found in Palestine and the equal of the best Egyptian art.



W9 Secretion and Excretion. Some questions readily answered for the pupil by this chart: What and where are the endocrine, digestive, excretory and lymphatic glands? What purposes of defense does the strategic grouping of the latter indicate? What lessons of moderation and health habits are learned from the glands? What health habits assist the glands in functioning properly?

The salivary glands, liver and pancreas have been studied for generations. The endocrine glands, the thyroid, parathyroid, pineal, pituitary and suprarenal are presented with the freshness of a revolutionizing idea. How a gland through the production of hormones can vitally affect, build up or change distant parts of the body offers fascinating problems for further study. The function of thyroid is illustrated in the metamorphosis of the frog, the suprarenal is capable of calling on great reserves of strength in emergencies. The lack of iodine in the goiter region of the United States indicates a treatment recommended for this condition.

The mechanism by which excretion is accomplished is shown by a study of the kidney and of the skin. The temperature control of the body through the skin and the protection against injury and infection are illustrated.

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Picture Rock Mystery Solved

Archæology

Dighton Rock, which has been one of the pet mysteries from prehistoric America since 1680, has been explained in reasonable fashion by a professor of psychology, Dr. Edmund B. Delabarre, of Brown University.

The pictures carved on the surface of this gray boulder in Massachusetts gained fame when the Rev. Cotton Mather included the rock in his book on the wonderful works of God. Since then, the rock has done multiple duty, bolstering up theories that the eastern coast of America was visited by the Phoenicians, the lost tribes of Israel, the Chinese, the Druids, the inhabitants of the traditional lost continent of Atlantis.

In a thorough investigation of the subject, just published in book form, Dr. Delabarre explains that by photographing the rock with flashlight, he revealed beneath the childish pictures and signs traces of the name Miguel Cortereal and the date 1511. Miguel and Gaspar Cortereal were two Portuguese brothers. Gaspar had sailed to Labrador and Newfoundland in 1501, and failed to return. In 1502 Miguel set out to find him, but was never heard of again. If Dr. Delabarre's interpretation of the badly worn Roman lettering is correct, Miguel reached New England and survived there among the Indians for at least ten years. It also means that the scrawly picture writing on the rock was, for the most part, at least, cut into it at a later time, and thus must be Indian in origin, except for two other records by white men which seem to have been carved in 1592 and again about 1640.

Dr. Delabarre has studied other inscribed rocks about Narragansett Bay and elsewhere in New England and believes that the work was done by Indians in Colonial times and supports his conclusion that the Indian practice was suggested by their contact with the invading culture of Europeans.

One difficulty encountered by those who would study Dighton Rock has always been its inconvenient location. It is at the edge of a river, and is exposed by tides for only brief periods. Another difficulty, pointed out by Dr. Delabarre, is that the irregularities of the rock surface from wear and tear blend with the carved pictures to the confusion of the student who would sort out the man-made mark from the markings of nature. Only a few of the pictographs are unmistakable, and the psychologist states that "it is evident that no two persons who study the surface and even no single person who studies it at different times can agree about what is there."

Science News-Letter, March 23, 1929

Canary Birds Aid Scientists

Hygiene

Little yellow canary birds can serve mankind in another way than with their singing. For ten years they have been subjects of experiment by scientists at the Johns Hopkins School of Hygiene and Public Health. Birds as well as men as subject to malaria. So the scientists have been able to discover many important facts about the disease by studying it in birds. The results of the ten-year-old study carried on by himself and associates at the Johns Hopkins University will be reported by Dr. Robert Hegner in the forthcoming issue of the *Quarterly Review of Biology*.

From canary bird studies, the scientists found that the parasites causing malaria exist almost entirely in the red cells of the blood. They were able to determine the exact number of parasites in a given quantity of blood at various stages of the disease. Feeding sugar to the bird, the scientists found, favors the development and growth of the parasites, while injecting insulin and thus decreasing the amount of sugar in the blood, is unfavorable for the parasite hence favorable for the bird.

These scientists found the exact relation between the stage of development of the parasites and the stage of the illness. They found how various factors in the sick individual affect the development and growth of the parasites, or how the individual resists the disease. From many discoveries of this sort, made by studying malaria in the canary birds, the scientists hope to gain further control over the disease in both birds and human beings.

Science News-Letter, March 23, 1929

Mice Have Disease Carriers

Medicine

Carriers of dangerous typhoid-like germs that scurry through the darkness of the night, unchecked by the careful health regulations that surround the human carriers, are suggested by the researches of Dr. Sara E. Branham of the U. S. Hygienic Laboratory of the Public Service here.

Many human diseases have close counterparts among animals. Among such diseases are those of the intestinal group related to typhoid fever. Scientists have now found that there may be animal as well as human carriers of these diseases, which may account for some otherwise unexplainable outbreaks.

A carrier has recovered from the disease but still harbors in its system the germs, ready to spread infection among others.

White mice particularly were found by Dr. Branham to be carriers of a group of intestinal diseases.

The white mice were inoculated with strains of the organisms that cause various intestinal diseases and so-called food poisonings. Those that recovered harbored the germs in their intestional tract and gall bladder, just as do human carriers. Guinea pigs and wild gray rats were also given the inoculations, but among their survivors no carriers were found. This does not mean that carriers may not exist among these rodents also, Dr. Branham pointed out, as the number of animals in the investigation was too small to give conclusive results.

Animal disease carriers may account for outbreaks in human beings which cannot otherwise be explained. Dr. Branham pointed out that food may become contaminated from infected rodents as easily as from infected humans.

Science News-Letter, March 23, 1929

Influenza Decreases

Medicine

A very marked decrease in influenza is noted in the reports received by the U. S. Public Health Service for the week ending March 9. In 27 states and New York City there were only 1,600 cases as against over 7,000 for the same states the week before. This great decrease will probably bring the total for the entire country well below the figure for the corresponding week of 1928.

Science News-Letter, March 23, 1929

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- ☐ *Dreams,* by Henri Louis Bergson, translated with an introduction by Edwin E. Slosson. New York, 1914. ..... .60
- ☐ *Easy Lessons in Einstein.* New York, 1920. ..... 1.35
- ☐ *Keeping Up with Science.* New York, 1924..... 2.50
- ☐ *Major Prophets of To-day.* Boston, 1914. ..... 2.00
- ☐ *The Physical Sciences.* Chicago, American Library Association (Reading with a purpose series), 1926. .....$ .50
- ☐ *Plots and Personalities,* by Edwin E. Slosson and June Downey. New York, 1922..... 1.75
- ☐ *Science Remaking the World,* edited by Otis W. Caldwell and Edwin E. Slosson. Garden City, 1925.. 1.00
- ☐ *Sermons of a Chemist.* New York, 1925. ..... 2.00
- ☐ *Smith's Intermediate Chemistry,* revised and rewritten by James Kendall and Edwin E. Slosson. New York, 1922..... 3.25
- ☐ *Snapshots of Science.* New York, 1928. ..... 2.00
- ☐ *Twentieth Century Europe,* by Preston William Slosson, with a supplementary chapter on modern science by Edwin E. Slosson. New York, 1927..... 6.00

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FIRST GLANCES AT NEW BOOKS

EMOTIONS AS THE BASIS OF CIVILIZATION—J. H. Denison—*Scribner's* ($5). Here is a change from the styles of history which have recently been the fashion, the economic theory, the geographic theory, the race theory, the great man theory. For to the author the most important motive in the history of the world is the emotional nature which finds expression in religion, family life, fraternal organizations, etc. He thinks that the patriarchal cultures of the past are breaking down in modern democracy but finds hope in the development of what he calls the "anepsiarchal" (cousinship) system of friendly groups and cooperatives.

Ethnology
Science News-Letter, March 23, 1929

CONVERSION IN SCIENCE—G. Elliott Smith—*Macmillan* (50c). The emotional and rational processes that lead to conversion in religion have often been examined by psychologists and philosophers, but the analogous processes by which a man "gets science" have been little looked into. In this interesting pamphlet the 1928 Huxley Memorial Lecturer undertakes this task, using Huxley himself as a type specimen.

Philosophy of Science
Science News-Letter, March 23, 1929

THE BEGINNING OF MAN—E. O. James—*Doubleday Doran* ($2.50). A well-known English anthropologist sets forth in clear and simple language the story of human evolution as illuminated by the discoveries of recent years. He credits even *Eoanthropus* with a good enough brain to entertain religious feelings.

Anthropology—Evolution
Science News-Letter, March 23, 1929

MAN'S PLACE IN NATURE—T. H. Huxley—*Appleton* ($1). A reprint, as a volume in the Appleton Dollar Library, of one of the classics of nineteenth-century science.

Evolution
Science News-Letter, March 23, 1929

ROMAN SURVEYING INSTRUMENTS—Edward Noble Stone—*University of Washington Press* ($.75). Present day surveyors and engineers will be interested in this pamphlet which should inspire engineering students to attempt a duplication of some of the accurate work of Roman surveyors and engineers using facsimiles of the instruments they used.

Engineering
Science News-Letter, March 23, 1929

A HISTORY OF PHYSICS—Florian Cajori—*Macmillan* ($3.50). It was in 1899 that the first edition of this work appeared, and it soon became a standard authority on the subject. The additional matter that is now included, thirty years later, is a striking illustration of the recent progress of physics. In 1899 the then recent discovery of X-rays and radioactivity had just begun to bring about the development that is now at its height and exemplified by the works of Einstein, Schrödinger, Heisenberg, Pauli, Dirac, Eddington, Bohr, Rutherford, the Braggs, and others. The basis of this work is just as important to the student of physics as the work of Galileo or Newton, and Professor Cajori describes it in his usual able manner. Without doubt this new edition will even surpass the popularity of its predecessor.

Physics
Science News-Letter, March 23, 1929

GEOLOGICAL MAP OF CENTRAL ASIA (EAST FERGHANA)—D. J. Mushketov—*Geological Committee, Leningrad.* The small quarto volume in hand is apparently a summary of a more detailed geological survey of a quadrat in Asia hitherto unexplored by science. The text is in English, slightly "foreign" in idiom but vigorously written and very readable; there are a number of excellent halftone plates and three maps (route, geological and tectonic) on a 1:420,000 scale. The keys to the conventions on the latter are bilingual—Russian-English. Geologists of other lands have reason to thank their Russian colleagues for making this summary of the outstanding facts about a little-known region thus easily available.

Geology
Science News-Letter, March 23, 1929

THE CLIMATE OF FLORIDA—A. J. Mitchell and M. R. Ensign—*Agr. Exp. Sta., Gainesville, Fla.* (Gratis). Here is solid shot for use in those interminable arguments about how good (or bad) the climate of that famous state is. Of the 200-odd pages, 185 are filled wholly with charts and tables giving actual meteorological records from cities and towns all the way from the Panhandle to the Keys, dating back, in some instances, as far as 1851.

Climatology
Science News-Letter, March 23, 1929

THE UNIVERSE OF STARS—Edited by Harlow Shapley and Cecilia H. Payne—*Harvard College Observatory* ($2). A few years ago the Harvard Observatory presented a series of radio talks on astronomy by members of its staff over Station WEEI. These were published in book form and achieved a well-deserved popularity. Now that a new edition has become necessary, the editors have taken the opportunity to add two new chapters; on the gaseous nebulae, by H. H. Plaskett, and the interior of a star, by B. P. Gerasimovic, and to bring the rest of the book up to date in all respects. The result is a popular summary of modern astronomy, told in the words of leading authorities and enhanced by a number of splendid illustrations of observatories and astronomical objects.

Astronomy
Science News-Letter, March 23, 1929

PROMETHEUS U. S. A.—Ernest Greenwood—*Harper's* ($2.50). A popular consideration of heat and fire in American life written by the author of "Aladdin, U. S. A."

Power
Science News-Letter, March 23, 1929

BELIEVE IT OR NOT!—Robert L. Ripley—*Simon and Schuster* ($2). A collection of several hundred curious facts (or at least the author claims that they are) from all parts of the world, all times, and all fields of knowledge.

General Science
Science News-Letter, March 23, 1929

THE YOUNG FOLKS' BOOK OF POLAR EXPLORATION—E. L. Elias—*Little, Brown* ($2). Long and interesting is the history of arctic and antarctic exploration. Within one volume the popular story of the great searchings to the two ends of the earth is told.

Geography
Science News-Letter, March 23, 1929

VERTEBRATE ZOOLOGY—G. R. de Beer—*Macmillan* ($5.50). A well-written, adequately illustrated textbook of zoology, approached from the comparative anatomy side.

Zoology
Science News-Letter, March 23, 1929

In a review of "The Bishop Murder Case" in this column last week, the name of Professor Harlow Shapley, of the Harvard College Observatory, was misspelled "Shapely." This was due to an error of the printer after the final page proofs had been returned.

First Glances at New Books—*Continued*

THE BIOLOGY OF SPIDERS—T. H. Savory—*Macmillan* ($5.50). Much has been written about the taxonomy of spiders, and more about their natural history. A good modern discussion of their bodily development and physiology has, however, been sadly lacking. This volume fits into the gap most exactly, and will be welcome to thousands of teachers and research workers in zoology.

Zoology
Science News-Letter, March 23, 1929

THE PRINCIPLES OF SYSTEMATIC ENTOMOLOGY—G. F. Ferris—*Stanford University Press* ($2 pa., $2.75 cl.). Nowhere, perhaps, do systematists encounter greater difficulties than in the study of insects. Although the fundamental legislation in entomological systematics is clear enough, there are hundreds of matters of policy and procedure that have long lacked adequate discussion. This the present volume supplies.

Entomology
Science News-Letter, March 23, 1929

A RECLASSIFICATION OF THE GENERA OF NORTH AMERICAN MELOIDAE (COLEOPTERA) and A REVISION OF THE GENERA AND SPECIES FORMERLY PLACED IN THE TRIBE MELOINI, FOUND IN AMERICA NORTH OF MEXICO, TOGETHER WITH DESCRIPTIONS OF NEW SPECIES.—E. C. Van Dyke—*University of California Press.* Of interest to systematic entomologists.

Entomology
Science News-Letter, March 23, 1929

PARASITES AND THE AID THEY GIVE IN PROBLEMS OF TAXONOMY, GEOGRAPHICAL DISTRIBUTION, AND PALEOGEOGRAPHY—Maynard M. Metcalf—*Smithsonian Institution.* A brief paper on a neglected but important subject by a man who has devoted many years of careful labor on a seemingly ungrateful task that has turned fruitful under his hands.

Parasitology—Zoogeography
Science News-Letter, March 23, 1929

TREES AND SHRUBS OF MINNESOTA—C. O. Rosendahl and F. K. Butters—*University of Minnesota Press* ($4). This book is a scholarly, well-edited addition to the gratifyingly increasing list of state and regional floras. It is especially to be desired that this literature be pushed to cover the Northwest, where Gray's Manual and the western floras do not always adequately overlap.

Botany
Science News-Letter, March 23, 1929

THE RADIO AMATEUR'S HANDBOOK—Francis Edward Handy and Rose A. Hull—*American Radio Relay League* ($1). The fourth edition of a little book that gives complete information about the construction and operation of short wave radio stations that have contributed so much to the advancement of radio in their use by amateurs. Full details are also given of the important work of the American Radio Relay League, which coördinates the activities of these amateurs, and has often proven invaluable when ordinary communications to stricken areas have been temporarily disabled.

Radio
Science News-Letter, March 23, 1929

WALK, LOOK AND LISTEN—R. T. Fuller—*John Day* ($2.50). This book is a collection of informal, non-technical descriptions of a miscellany of natural history objects likely to be encountered on a day's cross-country hike. No special systematic or logical order is observed, but things are taken, as they would be in nature, just as you come to them.

Natural History
Science News-Letter, March 23, 1929

THE PUBLIC AQUARIUM: ITS CONSTRUCTION, EQUIPMENT AND MANAGEMENT—C. H. Townsend—*Government Printing Office* (25c). A brief pamphlet, but packed with facts and suggestions that will be useful to educators and public administrators.

Biology
Science News-Letter, March 23, 1929

THE HUNTING OF THE BUFFALO—E. D. Branch—*Appleton* ($3). A dramatic presentation of the tremendous influence exerted by the mountains of meat that were the American bison upon the fortunes of the various inhabitants of this continent—Indians, Spaniards, Americans.

Zoology—History
Science News-Letter, March 23, 1929

A MANUAL OF THE RECENT WILD MAMMALS OF MICHIGAN—L. R. Dice—*University of Michigan* (75c). A brief synoptic key to the mammalian fauna of Michigan.

Zoology
Science News-Letter, March 23, 1929

THE HERPETOLOGY OF MICHIGAN—A. G. Ruthven, Crystal Thompson and Helen T. Gaige—*University of Michigan* ($1.50). A compact but complete account of the amphibians and reptiles of Michigan, well illustrated with photographs, analytic sketches and distribution maps.

Zoology
Science News-Letter, March 23, 1929

THE SCIENTIFIC PRINCIPLES OF PLANT PROTECTION—Hubert Martin—*Arnold* ($8.40). This book is a closely written exposition of the fundamental scientific aspects of the two great sub-sciences of economic entomology and phytopathology. It is not written with any eye on undergraduates or short-course students in agricultural colleges, but is adapted rather to the needs of the graduate, the research worker and the fighter in the field.

Economic Entomology—Phytopathology
Science News-Letter, March 23, 1929

THE STORY OF CANE SUGAR—*University of Hawaii* ($1.25; in lots of 20 or more, $1). A brief elementary discussion of sugar cane and cane sugar, from the biological, agronomic and economic points of view.

Agriculture—Economics
Science News-Letter, March 23, 1929

THE COOPERATIVE PATTERN IN COTTON—R. H. Montgomery—*Macmillan* ($2.50). A Texas professor of economics (who surely ought to know something about it!) looks at one of the toughest of American agrarian problems and tells of the steps that have been taken to find a way out.

Economics
Science News-Letter, March 23, 1929

PLANT PATHOLOGY AND PHYSIOLOGY IN RELATION TO MAN—A Symposium—Saunders ($2.50). A series of lectures delivered before a number of medical and scientific audiences in the Middle West during the autumn and winter of 1926 and 1927.

Botany
Science News-Letter, March 23, 1929

THE MAMMALS OF PENNSYLVANIA—S. H. Williams—*Author* ($2). Pennsylvania runs from eastern coastal plain, across a backbone of high mountains, to the gates of the Middle West. A state so fortunately situated offers to the naturalist a most unusual faunal wealth, and it is a matter for congratulation that Prof. Williams has here supplied a compact key.

Zoology
Science News-Letter, March 23, 1929

GENERAL ZOOLOGY—H. R. Linville, H. A. Kelly and H. J. Van Cleave—*Ginn* ($1.80). A well-gotten-up textbook for beginning students. Illegal in Tennessee, Mississippi and Arkansas.

Zoology
Science News-Letter, March 23, 1929